Package 'pctax'

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Type Package

Title Professional Comprehensive Omics Data Analysis

Version 0.1.1

Description Provides a comprehensive suite of tools for analyzing omics data. It includes functionalities for alpha diversity analysis, beta diversity analysis, differential abundance analysis, community assembly analysis, visualization of phylogenetic tree, and functional enrichment analysis. With a progressive approach, the package offers a range of analysis methods to explore and understand the complex communities. It is designed to support researchers and practitioners in conducting in-depth and professional omics data analysis.

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R topics documented:

add_strip . . . 3
add_tax . . . 4
ALDEX . . . 5
all_ec_info . . . 5
ann_tree . . . 6
aor . . . 7
as.b_dist . . . 8
as.dist.b_dist . . . 9
a_diversity . . . 10
bbtt . . . 11
before_tree . . . 11
b_analyse . . . 12
b_NTI1 . . . 13
b_res_3d . . . 14
check_taxonkit . . . 14
cor_net . . . 15
df2tree . . . 15
df2tree1 . . . 16
diff_da . . . 16
download_taxonkit_dataset . . . 17
envfitt . . . 18
geo_sim . . . 18
get_diff_type . . . 19
gp_dis_density . . . 20
grap_p_test . . . 20
install_taxonkit . . . 21
kwtest . . . 21
load_N_data . . . 22
mat_dist . . . 23
micro_sbatch . . . 23
multi_bar . . . 24
myRDA . . . 25
name_or_id2df . . . 26
ncm . . . 27
nst . . . 28
nti_rc . . . 29
pc_otu . . . 30
pc_tax1 . . . 31
pc_valid . . . 31
permanova . . . 32

plot.a_res . . . 33
plot.b_res . . . 33
plot.g_test . . . 35
plot.pro_res . . . 36
plot.time_cm . . . 36
plot_element_cycle . . . 37
plot_N_cycle . . . 38
pre_fastp . . . 39
pre_tax_table . . . 40
print.pc_otu . . . 41
procrustes_analyse . . . 41
rarefaction . . . 42
rare_curve_sample . . . 42
rare_curve_species . . . 43
RCbray1 . . . 44
RDA_plot . . . 45
suijisenlin . . . 47
summary.pc_otu . . . 47
taxonkit_filter . . . 48
taxonkit_lca . . . 49
taxonkit_lineage . . . 50
taxonkit_list . . . 51
taxonkit_name2taxid . . . 52
taxonkit_reformat . . . 53
time_by_cm . . . 55
volcano_p . . . 56
z_diversity . . . 57
z_diversity_decay . . . 58

Index **59**

`add_strip` *add strips for a tree plot*

Description

add strips for a tree plot

Usage

```
add_strip(trp, some_tax, flat_n = 5, strip_params = NULL)
```

Arguments

`trp`	tree plot from `ggtree`
`some_tax`	some tax you want to add strip
`flat_n`	flat the text when taxa number more than `flat_n`.
`strip_params`	parameters parse to `geom_strip`

Value

tree plot

Examples

```
data(otutab, package = "pcutils")
# run yourself
if (interactive()) {
  ann_tree(taxonomy, otutab) -> tree
  easy_tree(tree) -> p
  some_tax <- table(taxonomy$Phylum) %>%
    sort(decreasing = TRUE) %>%
    head(5) %>%
    names()
  add_strip(p, some_tax)
}
```

---

add_tax *Add taxonomy for a pc_otu object*

Description

Add taxonomy for a pc_otu object

Usage

```
add_tax(pc, taxonomy)
```

Arguments

pc	a pc_otu object
taxonomy	a taxomomy data.frame, look out the rownames of taxonomy and otutab should matched!

Value

pc_otu

Examples

```
data(otutab, package = "pcutils")
pc_tax1 <- pc_otu(otutab, metadata)
pc_tax1 <- add_tax(pc_tax1, taxonomy)
```

ALDEX *ALDEX*

Description

ALDEX

Usage

```
ALDEX(otutab, group_df)
```

Arguments

otutab	otutab
group_df	a dataframe with rowname same to dist and one group column

Value

diff

References

https://cloud.tencent.com/developer/article/1621879

Examples

```
if (requireNamespace("ALDEx2")) {
  data(otutab, package = "pcutils")
  ALDEX(otutab, metadata["Group"]) -> res
  res %>%
    dplyr::top_n(9, -glm.eBH) %>%
    .[, "tax"] -> sig
  data.frame(t(otutab[sig, ])) %>% pcutils::group_box(., "Group", metadata)
}
```

---

all_ec_info *all element cycle information.*

Description

all element cycle information.

Format

a list contains four tables.

ec_node chemicals

ec_link reactions

ec_gene genes

ec_path reactions labels

`ann_tree` *Annotate a tree*

Description

Annotate a tree

Easy way to plot a phylogenetic tree

Usage

```
ann_tree(f_tax, otutab = NULL, level = ncol(f_tax))

easy_tree(
  tree,
  highlight = "Phylum",
  colorfill = "color",
  pal = NULL,
  name_prefix = FALSE,
  basic_params = NULL,
  add_abundance = TRUE,
  color_name = "abundance",
  add_tiplab = TRUE,
  fontsize = NULL
)
```

Arguments

`f_tax`	taxonomy dataframe
`otutab`	otutab, rowname==rowname(taxonomy)
`level`	1~7
`tree`	result from `ann_tree`
`highlight`	highlight which level, one of `tree$level`
`colorfill`	"color" or "fill"
`pal`	color pal
`name_prefix`	keep the prefix like "k__" or "p__" in the label? Default: FALSE

basic_params	parameters parse to ggtree
add_abundance	logical
color_name	color name
add_tiplab	logical
fontsize	tip label fontsize

Value

a treedata

a ggplot

Examples

```
if (interactive()) {
  data(otutab, package = "pcutils")
  ann_tree(taxonomy, otutab) -> tree
  # run yourself
  easy_tree(tree, add_abundance = FALSE) -> p
  p
}
```

---

aor *Calculate Abundance-occupancy_relationship*

Description

Calculate Abundance-occupancy_relationship

Plot a AOR

Usage

```
aor(otutab, ...)

## S3 method for class 'data.frame'
aor(
  otutab,
  top_r = 0.7,
  ocup_n = ceiling(0.8 * ncol(otutab)),
  special_n = ceiling(0.1 * ncol(otutab)),
  ...
)

## S3 method for class 'AOR'
plot(x, ...)
```

Arguments

otutab	otutab
...	add
top_r	percentage of top relative abundance
ocup_n	percentage of top occupied
special_n	how many occupancy define as specialists
x	AOR object

Value

AOR

ggplot

References

Barberán, A., Bates, S. T., Casamayor, E. & Fierer, N. (2012) Using network analysis to explore co-occurrence patterns in soil microbial communities.

Examples

```
data(otutab, package = "pcutils")
aor(otutab) -> AOR
plot(AOR)
```

---

as.b_dist *Transfer dist to b_dist*

Description

Transfer dist to b_dist

Plot dist

Plot b_dist

Usage

```
as.b_dist(dist, group_df = NULL)

## S3 method for class 'dist'
plot(x, group_df = NULL, ...)

## S3 method for class 'b_dist'
plot(x, mode = 1, c_group = "inter", ...)
```

Arguments

dist	a dist object
group_df	a dataframe with rowname same to dist and one group column
x	a b_dist
...	additional
mode	1~3
c_group	"inter" or "intra" or both to plot

Value

a b_dist with annotation by group

a pheatmap

a ggplot or pheatmap

Examples

```
data(otutab, package = "pcutils")
mat_dist(otutab) %>% as.b_dist(., group_df = metadata["Group"]) -> aa
plot(aa)
plot(aa, mode = 2)
```

---

as.dist.b_dist *Transfer b_dist to dist*

Description

Transfer b_dist to dist

Usage

```
## S3 method for class 'b_dist'
as.dist(m, diag = FALSE, upper = FALSE)
```

Arguments

m	a b_dist object
diag	logical value indicating whether the diagonal of the distance matrix should be printed by `print.dist`.
upper	logical value indicating whether the upper triangle of the distance matrix should be printed by `print.dist`.

Value

dist

a_diversity *Calculate a_diversity of otutab*

Description

Calculate a_diversity of otutab

Usage

```
a_diversity(otutab, ...)

## S3 method for class 'data.frame'
a_diversity(
  otutab,
  method = c("richness", "shannon"),
  tree = NULL,
  digits = 4,
  ...
)

## S3 method for class 'pc_otu'
a_diversity(otutab, method = "all", tbl = "otutab", ...)

## S3 method for class 'numeric'
a_diversity(otutab, ...)
```

Arguments

otutab	numeric
...	pass to a_diversity.data.frame
method	one of "all","richness","chao1","ace","gc","shannon","simpson","pd","pielou"
tree	a iphylo object match the rownames of otutab
digits	maintance how many digits
tbl	which table

Value

a a_res object

Examples

```
data(otutab, package = "pcutils")
a_diversity(otutab) -> a_res
plot(a_res, "Group", metadata)
```

bbtt *ggdotchart for diff analysis*

Description

ggdotchart for diff analysis

Usage

```
bbtt(res, pvalue = "glm.eBH", topN = 20)
```

Arguments

res	result of ALDEX or kwtest
pvalue	the name of pvaule
topN	topN

Value

ggplot

before_tree *Before df2tree check*

Description

Before df2tree check

Usage

```
before_tree(f_tax)
```

Arguments

f_tax	table

Value

table

Examples

```
wrong_taxdf <- data.frame(
  kingdom = c(rep(c("A", "B"), each = 4), "C", NA),
  "phylum" = c("A", "a", "b", "c", "c", "c", "d", NA, NA, "e")
)
before_tree(wrong_taxdf)
```

b_analyse *Beta_diversity Ordination: dimensionality reduction*

Description

Species abundance data can be preprocessed with Hellinger transformation or chord transformation data before PCA analysis. Because the Hellinger distance or chord distance with-without data is equal to $\sqrt{2}\sqrt{1 - Ochiai\ similarity}$, therefore, the sorting diagram (type 1 scale) of PCA analysis after Hellinger transformation or chord transformation with-without data is internal sample The distance between the squares is the Ochiai distance. $\sqrt{2}\sqrt{1 - Ochiai\ similarity}$ is a distance measure, which is also suitable for the analysis of species data. The processed data is then used for pca without norm.

Usage

```
b_analyse(otutab, ...)

## S3 method for class 'data.frame'
b_analyse(
  otutab,
  norm = TRUE,
  method = c("pca", "nmds"),
  group = NULL,
  dist = "bray",
  ndim = 2,
  scale = FALSE,
  ...
)
```

Arguments

otutab	an otutab data.frame, samples are columns, taxs are rows.
...	add
norm	should normalized or not? (hellinger)
method	one of "pca","pcoa","ca","dca","nmds","plsda","tsne","umap","lda","all"
group	if needed, give a group vector
dist	if use pcoa or nmds, your can choose a dist method (default: bray) or input a distance matrix.
ndim	how many dimension be kept? (default:2). 3 for b_res_3d()
scale	scale, default: FALSE

Value

b_res object

References

https://www.jianshu.com/p/9694c0b6302d https://zhuanlan.zhihu.com/p/25501130

Examples

```
data(otutab, package = "pcutils")
b_analyse(otutab, method = "pca") -> b_res
plot(b_res, "Group", metadata)
```

---

b_NTI1 *Calculate beta_NTI*

Description

Calculate beta_NTI

Usage

```
b_NTI1(
  phylo,
  otutab,
  beta.reps = 9,
  weighted = TRUE,
  threads = 1,
  verbose = TRUE
)
```

Arguments

phylo	a phylo object
otutab	otutab
beta.reps	how many simulation performed?
weighted	logical
threads	use how many threads to calculate (default:4)
verbose	verbose

Value

a dist: b_NTI

b_res_3d *3D plot for b_res*

Description

3D plot for b_res

Usage

```
b_res_3d(b_res, Group, metadata = NULL, ...)
```

Arguments

b_res	a b_res object
Group	group vector for color
metadata	metadata contain Group
...	add

Value

plotly list

Examples

```
if (requireNamespace("plotly")) {
  data(otutab, package = "pcutils")
  b_analyse(otutab, method = "pca", ndim = 3) -> b_res
  b_res_3d(b_res, "Group", metadata)
}
```

check_taxonkit *Check taxonkit*

Description

Check taxonkit

Usage

```
check_taxonkit(print = TRUE)
```

Arguments

print	print

Value

taxonkit path

cor_net *Correlation network, species-interaction network for omics*

Description

Correlation network, species-interaction network for omics

Usage

```
cor_net()
```

Value

No value

df2tree *From a dataframe to construct a phylo*

Description

NOTE: this function will do `before_tree` first.

Usage

```
df2tree(data, edge_df = FALSE)
```

Arguments

`data`	dataframe
`edge_df`	if the data is edge_df ?

Value

phylo object

Examples

```
data(otutab, package = "pcutils")
df2tree(taxonomy) -> tax_tree
print(tax_tree)
# check all nodes matched!
if (requireNamespace("picante")) {
  picante::match.phylo.comm(tax_tree, t(otutab)) -> nn
  nrow(nn$comm) == nrow(t(otutab))
}
```

df2tree1 *From a dataframe to construct a phylo (save nwk)*

Description

NOTE: this function will transfer all space to _

Usage

```
df2tree1(taxa)
```

Arguments

taxa	dataframe

Value

phylo object

Examples

```
data(otutab, package = "pcutils")
df2tree(taxonomy) -> tax_tree
print(tax_tree)
```

diff_da *Difference analysis*

Description

Difference analysis

Usage

```
diff_da(
  otutab,
  group_df,
  ctrl = NULL,
  method = "deseq2",
  log = TRUE,
  add_mini = NULL,
  ...
)
```

Arguments

otutab	otutab
group_df	a dataframe with rowname same to dist and one group column
ctrl	the control group, one level of groups
method	one of "deseq2","edger","limma","t.test","wilcox.test"
log	do log transfer for limma?
add_mini	add_mini when calculate the logFC. e.g (10+0.1)/(0+0.1), default `0.5*min(abundance)`
...	other parameters

Value

a dataframe

Examples

```
if (requireNamespace("limma")) {
  data(otutab, package = "pcutils")
  diff_da(otutab, metadata["Group"], method = "limma") -> res
  volcano_p(res)
  volcano_p(res, mode = 2)
}
```

---

download_taxonkit_dataset

Download taxonkit dataset

Description

Download taxonkit dataset

Usage

```
download_taxonkit_dataset(make_sure = FALSE, taxdump_tar_gz = NULL)
```

Arguments

make_sure	make sure to do this
taxdump_tar_gz	your download taxdump_tar_gz file from https://ftp.ncbi.nih.gov/pub/taxonomy/taxdump.tar.gz

Value

No value

envfitt *Envfit test for RDA result*

Description

Envfit test for RDA result

Usage

```
envfitt(phy.rda, env, ...)
```

Arguments

phy.rda	a rda result
env	environmental factors
...	add

Value

g_test object

See Also

envfit

Examples

```
data(otutab, package = "pcutils")
env <- metadata[, 6:10]
# RDA
myRDA(otutab, env) -> phy.rda
envfitt(phy.rda, env) -> envfit_res
plot(envfit_res)
```

geo_sim *Lm for sample similarity and geographical distance*

Description

Lm for sample similarity and geographical distance

Usage

```
geo_sim(otutab, geo, method = "bray", spe_nwk = NULL, ...)
```

Arguments

otutab	an otutab data.frame, samples are columns, taxs are rows.
geo	a two-columns dataframe, first is latitude, second is longitude
method	Dissimilarity index, partial match to "bray", "euclidean"...see vegdist;unifrac
spe_nwk	a phylo tree if use unifrac...
...	additional

Value

a ggplot

References

Graco-Roza, C. et al. (2022) Distance decay 2.0 - A global synthesis of taxonomic and functional turnover in ecological communities. Glob Ecol Biogeogr 31, 1399–1421.

Examples

```
if (requireNamespace("NST") && requireNamespace("geosphere")) {
  library(ggplot2)
  data(otutab, package = "pcutils")
  metadata[, c("lat", "long")] -> geo
  geo_sim(otutab, geo) -> geo_res
  pcutils::my_lm(geo_res[4], "dis.geo", geo_res)
}
```

---

get_diff_type *Get mean and type*

Description

Get mean and type

Usage

```
get_diff_type(otutab, group_df)
```

Arguments

otutab	otutab
group_df	a dataframe with rowname same to dist and one group column

Value

No value

gp_dis_density *Group inter-intra density*

Description

Group inter-intra density

Usage

```
gp_dis_density(otutab, group)
```

Arguments

otutab	an otutab data.frame, samples are columns, taxs are rows.
group	group vector

Value

ggplot

Examples

```
data(otutab, package = "pcutils")
gp_dis_density(otutab, metadata["Group"])
```

grap_p_test *Performs graph-based permutation tests*

Description

Performs graph-based permutation tests

Usage

```
grap_p_test(otutab, metadata, group = "Group", nperm = 999, ...)
```

Arguments

otutab	an otutab data.frame, samples are columns, taxs are rows.
metadata	metadata
group	one group name in columns of metadata
nperm	numbers of permutations to perform
...	additional

Value

ggplot

Examples

```
if (requireNamespace("phyloseqGraphTest") && requireNamespace("phyloseq")) {
  data(otutab, package = "pcutils")
  grap_p_test(otutab, metadata, "Group")
}
```

---

install_taxonkit *Install taxonkit*

Description

Install taxonkit

Usage

```
install_taxonkit(make_sure = FALSE, taxonkit_tar_gz = NULL)
```

Arguments

make_sure	make sure to do this
taxonkit_tar_gz	your download taxonkit_tar_gz file from https://github.com/shenwei356/taxonkit/releases/

Value

No value

---

kwtest *KW test*

Description

KW test

Usage

```
kwtest(otutab, group_df, method = "kruskal.test")
```

Arguments

otutab	otutab
group_df	a dataframe with rowname same to dist and one group column
method	"kruskal.test", see compare_means

Value

res

Examples

```
data(otutab, package = "pcutils")
kwtest(otutab, metadata["Group"]) -> res
bbtt(res, pvalue = "p.format")
```

---

load_N_data *Load N-cycle data*

Description

Load N-cycle data

Usage

```
load_N_data()
```

Value

list

References

Tu, Q., Lin, L., Cheng, L., Deng, Y. & He, Z. (2019) NCycDB: a curated integrative database for fast and accurate metagenomic profiling of nitrogen cycling genes. Bioinformatics 35, 1040–1048. Kuypers, M. M. M., Marchant, H. K. & Kartal, B. (2018) The microbial nitrogen-cycling network. Nat Rev Microbiol 16, 263–276.

mat_dist *Calculate distance for otutab*

Description

Calculate distance for otutab

Usage

```
mat_dist(otutab, method = "bray", spe_nwk = NULL)
```

Arguments

otutab	an otutab data.frame, samples are columns, taxs are rows.
method	Dissimilarity index, partial match to "bray", "euclidean"...see vegdist;unifrac
spe_nwk	a phylo tree if use unifrac...

Value

dist

Examples

```
data(otutab, package = "pcutils")
mat_dist(otutab)
```

micro_sbatch *Microbiome sbatch*

Description

Microbiome sbatch

Usage

```
micro_sbatch(
  work_dir = "/share/home/jianglab/pengchen/work/asthma/",
  step = "fastp",
  all_sample_num = 40,
  array = 1,
  partition = "cpu",
  cpus_per_task = 1,
  mem_per_cpu = "2G"
)
```

Arguments

work_dir	work_dir
step	"fastp","rm_human","megahit","prodigal","salmon-quant",...
all_sample_num	all sample number
array	array number
partition	partition
cpus_per_task	cpus_per_task
mem_per_cpu	mem_per_cpu, "2G"

Value

No value

---

multi_bar *Difference analysis*

Description

Difference analysis

Usage

```
multi_bar(
  otutab,
  group_df,
  mode = 1,
  text_df = NULL,
  text_x = NULL,
  text_angle = -90,
  errorbar = "bottom"
)
```

Arguments

otutab	otutab
group_df	a dataframe with rowname same to dist and one group column
mode	1~2
text_df	text_df
text_x	text_x
text_angle	text_angle
errorbar	top, bottom, none

Value

a data.frame

Examples

```
data(otutab, package = "pcutils")
multi_bar(otutab[1:10, ], metadata["Group"])
```

---

myRDA *RDA*

Description

RDA

Usage

```
myRDA(
  otutab,
  env,
  norm = TRUE,
  scale = FALSE,
  choose_var = FALSE,
  direction = "forward",
  nperm = 499,
  verbose = TRUE,
  method = "rda",
  dist = "bray"
)

myCCA(
  otutab,
  env,
  norm = TRUE,
  scale = FALSE,
  choose_var = FALSE,
  nperm = 499,
  verbose = TRUE
)

myCAP(
  otutab,
  env,
  norm = TRUE,
  scale = FALSE,
  choose_var = FALSE,
  nperm = 499,
```

```
  verbose = TRUE,
  dist = "bray"
)
```

Arguments

otutab	an otutab data.frame, samples are columns, taxs are rows.
env	environmental factors
norm	should normalize? (default:TRUE)
scale	should scale species? (default:FALSE)
choose_var	should choose variables? use forward step
direction	The direction of the stepwise selection, "both", "forward" or "backward", default is "forward"
nperm	number of permutation
verbose	verbose
method	"rda", "cca", "cap", "dbrda"
dist	The name of the dissimilarity (or distance) index for "cap" or "dbrda", for vegdist

Value

rda/cca

See Also

vegdist;unifrac

Examples

```
data(otutab, package = "pcutils")
env <- metadata[, 6:10]
# RDA
myRDA(otutab, env) -> phy.rda
RDA_plot(phy.rda, "Group", metadata)
```

---

name_or_id2df *Transfer taxon name or taxid to the lineage dataframe*

Description

Transfer taxon name or taxid to the lineage dataframe

Usage

```
name_or_id2df(
  name_or_id,
  mode = "name",
  add_prefix = TRUE,
  fill_miss_rank = TRUE,
  data_dir = NULL
)
```

Arguments

name_or_id	name or taxid
mode	"id" or "name"
add_prefix	add_prefix
fill_miss_rank	fill_miss_rank
data_dir	directory containing nodes.dmp and names.dmp (default "/Users/asa/.taxonkit")

Value

dataframe

Examples

```
## Not run:
name_or_id2df(c("Homo sapiens", "Akkermansia muciniphila ATCC BAA-835"))

## End(Not run)
```

---

ncm *Sloan Neutral Model*

Description

Sloan Neutral Model

Plot ncm_res

Usage

```
ncm(otutab, model = "nls")

## S3 method for class 'ncm_res'
plot(
  x,
  mycols = c(Above = "#069870", Below = "#e29e02", In = "#1e353a"),
  text_position = NULL,
  ...
)
```

Arguments

otutab	an otutab data.frame, samples are columns, taxs are rows.
model	fit method, one of "nls","mle"
x	a ncm_res object
mycols	mycols
text_position	text_position
...	add

Value

ncm_res

ggplot

References

Sloan, W. TRUE. et al. (2006) Quantifying the roles of immigration and chance in shaping prokaryote community structure. Environmental Microbiology 8, 732–740.

Examples

```
if (requireNamespace("Hmisc") && requireNamespace("minpack.lm")) {
  data(otutab, package = "pcutils")
  ncm(otutab) -> ncm_res
  plot(ncm_res)
}
```

---

nst *Calculate NST for each group*

Description

Calculate NST for each group

Usage

```
nst(otutab, group_df, threads = 1, file = NULL, rep = 20, save = FALSE)
```

Arguments

otutab	an otutab data.frame, samples are columns, taxs are rows.
group_df	a dataframe with rowname and one group column
threads	default:4
file	filename to save
rep	repeat numbers: suggest 999
save	save the file

Value

a b_dist object, dis is MSTij

References

Ning, D., Deng, Y., Tiedje, J. M. & Zhou, J. (2019) A general framework for quantitatively assessing ecological stochasticity. Proceedings of the National Academy of Sciences 116, 16892–16898.

Examples

```
if (requireNamespace("NST")) {
  library(ggplot2)
  data(otutab, package = "pcutils")
  nst(otutab, metadata["Group"]) -> nst_res
  plot(nst_res, c_group = "intra") + geom_hline(yintercept = 0.5, lty = 2) + ylab("NST")
}
```

---

nti_rc *Calculate b_NTI and RC_bray for each group*

Description

Calculate b_NTI and RC_bray for each group

Plot NTI_RC object

Usage

```
nti_rc(
  otutab,
  phylo,
  group_df,
  threads = 1,
  file = NULL,
  rep = 20,
  save = FALSE
)

## S3 method for class 'NTI_RC'
plot(x, ...)
```

Arguments

otutab	an otutab data.frame, samples are columns, taxs are rows.
phylo	a phylo object
group_df	a dataframe with rowname and one group column

threads	default:4
file	filename to save
rep	repeat numbers: suggest 999
save	save the file
x	NTI_RC object
...	pass to stackplot

Value

a b_dist object, dis is MSTij

ggplot

References

Ning, D., Deng, Y., Tiedje, J. M. & Zhou, J. (2019) A general framework for quantitatively assessing ecological stochasticity. Proceedings of the National Academy of Sciences 116, 16892–16898.

Examples

```
if (requireNamespace("NST") && requireNamespace("pctax")) {
  data(otutab, package = "pcutils")
  pctax::df2tree(taxonomy) -> phylo
  nti_rc(otutab, phylo, metadata["Group"]) -> nti_res
  plot(nti_res)
}
```

---

pc_otu *Create a pc_otu class object*

Description

Create a pc_otu class object

Usage

```
pc_otu(otutab = data.frame(), metadata = data.frame(), taxonomy = NULL, ...)
```

Arguments

otutab	an otutab data.frame, samples are columns, taxs are rows.
metadata	a metadata data.frame, samples are rows
taxonomy	a taxomomy data.frame, look out the rowname of taxonomy and otutab should matched!
...	add

Value

pc_otu

Examples

```
data(otutab, package = "pcutils")
pc_tax1 <- pc_otu(otutab, metadata)
print(pc_tax1)
```

`pc_tax1` *test data (pc_otu class) for pc_tax package.*

Description

an otutab, metadata and a taxonomy table.

Format

a pc_otu contains an otutab, metadata and a taxonomy table.

tbls contians otutable rawdata

metas contians metadata

otus contians taxomomy table

`pc_valid` *Judge pc_otu is valid or not*

Description

Judge pc_otu is valid or not

Usage

```
pc_valid(pc)
```

Arguments

pc	a pc_otu object

Value

logical

permanova *Permanova between a otutab and a variable*

Description

Permanova between a otutab and a variable

Usage

```
permanova(
  otutab,
  envs,
  norm = TRUE,
  each = TRUE,
  method = "adonis",
  dist = "bray",
  nperm = 999,
  ...
)
```

Arguments

otutab	an otutab data.frame, samples are columns, taxs are rows.
envs	factors need to test
norm	should normalize?(default:TRUE)
each	test factor one by one, rather than whole
method	adonis/mrpp/anosim/mantel
dist	if use pcoa or nmds, your can choose a dist method (default: bray)
nperm	numbers of permutations to perform
...	additional

Value

a g_test object with these columns

group	the test group or factor
r	relationship
r2	model R-square
p_value	model test p_value
sig	whether significant

References

https://blog.csdn.net/qq_42458954/article/details/110390488

Examples

```
data(otutab, package = "pcutils")
permanova(otutab, metadata[, c(2:10)]) -> adonis_res
print(adonis_res)
plot(adonis_res)
```

`plot.a_res` *Plot a_res object*

Description

Plot a_res object

Usage

```
## S3 method for class 'a_res'
plot(x, group, metadata, ...)
```

Arguments

`x`	a a_res object
`group`	one of colname of metadata
`metadata`	metadata
`...`	addditional parameters for `group_box` or `my_lm`

Value

patchwork object,you can change theme with &

See Also

`a_diversity`

`plot.b_res` *Plot a b_res*

Description

Plot a b_res

Usage

```
## S3 method for class 'b_res'
plot(
  x,
  Group,
  metadata = NULL,
  Group2 = NULL,
  mode = 1,
  bi = FALSE,
  Topn = 10,
  rate = 1,
  margin = FALSE,
  margin_label = TRUE,
  permanova_res = NULL,
  text_param = list(),
  box_margin = TRUE,
  box_param = list(),
  pal = NULL,
  sample_label = TRUE,
  stat_ellipse = TRUE,
  coord_fix = FALSE,
  bi_text_size = 3,
  ...
)
```

Arguments

x	a b_res object
Group	group vector for color
metadata	metadata contain Group
Group2	mapping point shape
mode	plot mode:1~3
bi	plot variables segments?
Topn	how many variables to show?
rate	segments length rate
margin	plot the margin boxplot?
margin_label	margin_label, TRUE
permanova_res	permanova result
text_param	text_param for annotate
box_margin	margin plot box or density?
box_param	box_param for group_box
pal	colors for group
sample_label	plot the labels of samples?

stat_ellipse	plot the stat_ellipse?
coord_fix	fix the coordinates y/x ratio
bi_text_size	biplot text size
...	add

Value

a ggplot

See Also

b_analyse

`plot.g_test` *Plot g_test*

Description

Plot g_test

Usage

```
## S3 method for class 'g_test'
plot(x, ...)
```

Arguments

x	a g_test object
...	add

Value

ggplot

See Also

permanova

plot.pro_res *Plot pro_res*

Description

Plot pro_res

Usage

```
## S3 method for class 'pro_res'
plot(x, group, metadata = NULL, pal = NULL, ...)
```

Arguments

x	pro_res
group	group
metadata	metadata
pal	pal
...	add

Value

a ggplot

plot.time_cm *Plot time_cm*

Description

Plot time_cm

Usage

```
## S3 method for class 'time_cm'
plot(x, mem_thr = 0.6, ...)
```

Arguments

x	time_cm
mem_thr	membership threshold
...	add

Value

ggplot

`plot_element_cycle` *Plot element cycle*

Description

Plot element cycle

Usage

```
plot_element_cycle(
  cycle = "Nitrogen cycle",
  anno_df = NULL,
  only_anno = FALSE,
  cell_fill = NA,
  cell_color = "orange",
  chemical_size = 7,
  chemical_bold = TRUE,
  chemical_color = "black",
  chemical_label = TRUE,
  reaction_width = 1,
  reaction_arrow_size = 4,
  reaction_arrow_closed = TRUE,
  gene_or_ko = "gene",
  gene_size = 3,
  gene_x_offset = 0.3,
  gene_y_offset = 0.15,
  gene_label = TRUE,
  gene_color = NULL,
  gene_bold = TRUE,
  gene_italic = TRUE,
  gene_label_fill = "white"
)
```

Arguments

`cycle`	one of c("Carbon cycle","Nitrogen cycle","Phosphorus cycle","Sulfur cycle","Iron cycle")
`anno_df`	anno_df, columns should contains Gene or KO and Group
`only_anno`	only show genes in anno_df?
`cell_fill`	cell fill color
`cell_color`	cell border color
`chemical_size`	chemical text size
`chemical_bold`	chemical text bold
`chemical_color`	chemical text color
`chemical_label`	chemical text in geom_label or geom_text?

reaction_width	reaction line width
reaction_arrow_size	reaction arrow size
reaction_arrow_closed	reaction arrow closed?
gene_or_ko	"gene" or "ko"
gene_size	gene text size
gene_x_offset	gene_x_offset
gene_y_offset	gene_y_offset
gene_label	gene text in geom_label or geom_text?
gene_color	gene text color
gene_bold	gene text blod?
gene_italic	gene text italic?
gene_label_fill	gene label fill color

Value

ggplot

Examples

```
if (requireNamespace("ggforce")) plot_element_cycle()
```

---

plot_N_cycle *Plot the N-cycling pathway and genes*

Description

Plot the N-cycling pathway and genes

Usage

```
plot_N_cycle(
  my_N_genes = NULL,
  just_diff = FALSE,
  path_col = NULL,
  type_col = c(up = "red", down = "blue", none = NA),
  fill_alpha = 0.5,
  arrow_size = 0.1,
  line_width = 1,
  title = "Nitrogen cycling",
  legend.position = c(0.85, 0.15)
)
```

Arguments

my_N_genes	dataframe, "Gene_families","type" should in colnames of my_N_genes
just_diff	logical, just plot the different genes?
path_col	colors of pathways
type_col	colors of types
fill_alpha	alpha, default 0.5
arrow_size	arrow_size, default 0.1
line_width	line_width, default 1
title	title, default "Nitrogen cycling"
legend.position	default c(0.85,0.15)

Value

ggplot

Examples

```
N_data <- load_N_data()
my_N_genes <- data.frame(
  `Gene_families` = sample(N_data$N_genes$Gene_families, 10, replace = FALSE),
  change = rnorm(10), check.names = FALSE
)
my_N_genes <- dplyr::mutate(my_N_genes,
  type = ifelse(change > 0, "up", ifelse(change < 0, "down", "none"))
)
plot_N_cycle(my_N_genes, just_diff = FALSE, fill_alpha = 0.2)
# ggsave(filename = "test.pdf", width = 14, height = 10)
```

---

pre_fastp *Prepare the result from fastp (.json file)*

Description

Prepare the result from fastp (.json file)

Usage

```
pre_fastp(jsonfiles, prefix = c("Raw", "Clean"))
```

Arguments

jsonfiles	the directory contains .json file
prefix	default c("Raw","Clean"), for the before filtering and after filtering.

Value

data.frame

pre_tax_table *Complete a taxonomy table*

Description

Complete a taxonomy table

Usage

```
pre_tax_table(
  tax_table,
  tax_levels = c("k", "p", "c", "o", "f", "g", "s", "st"),
 na_tax = "Unclassified|uncultured|Ambiguous|Unknown|unknown|metagenome|Unassig",
  ignore.case = TRUE,
  na_repalce = "Unknown"
)
```

Arguments

tax_table	taxonomy table
tax_levels	a vector whose length longer than ncol(taxdf), use to be prefix. Default: c("k", "p", "c", "o", "f", "g","s", "st")
na_tax	grepl some words and turn to na_repalce, default: "Unclassified|uncultured|Ambiguous|Unknown|unkno
ignore.case	ignore.case for na_tax
na_repalce	defalut: Unknown

Value

a good taxonomy table

References

MicrobiotaProcess

Examples

```
taxmat <- matrix(sample("onelevel", 7 * 2, replace = TRUE), nrow = 2, ncol = 7) %>% as.data.frame()
colnames(taxmat) <- c("Kingdom", "Phylum", "Class", "Order", "Family", "Genus", "Species")
pre_tax_table(taxmat)
```

print.pc_otu *Print*

Description

Print

Usage

```
## S3 method for class 'pc_otu'
print(x, ...)
```

Arguments

x	pc_otu
...	add

Value

No value

procrustes_analyse *Procrustes Rotation of Two Configurations and PROTEST*

Description

Procrustes Rotation of Two Configurations and PROTEST

Usage

```
procrustes_analyse(b_res1, b_res2, nperm = 999, ...)
```

Arguments

b_res1	Target matrix
b_res2	Matrix to be rotated
nperm	numbers of permutations to perform
...	additional

Value

pro_res

Examples

```
data(otutab, package = "pcutils")
b_analyse(otutab, method = "pca") -> b_res1
b_analyse(otutab * abs(rnorm(10)), method = "pca") -> b_res2
pro_res <- procrustes_analyse(b_res1, b_res2)
plot(pro_res, "Group", metadata)
```

`rarefaction` *Rarefy a otutab*

Description

Rarefy a otutab

Usage

```
rarefaction(otutab, sample = NULL)
```

Arguments

`otutab`	otutab
`sample`	number

Value

a rarefied otutab

Examples

```
data(otutab, package = "pcutils")
rarefaction(otutab)
```

`rare_curve_sample` *Rare the sample*

Description

Rare the sample

Plot a rare curve

Usage

```
rare_curve_sample(otutab, rep = 30, count_cutoff = 1)

## S3 method for class 'rare_res'
plot(x, ...)
```

Arguments

otutab	otutab
rep	repeats number
count_cutoff	cutoff to be 0
x	AOR object
...	add

Value

ggplot

ggplot

Examples

```
data(otutab, package = "pcutils")
a <- rare_curve_sample(otutab)
plot(a)
```

---

rare_curve_species *Rare the species*

Description

Rare the species

Usage

```
rare_curve_species(
  otutab,
  step = 2000,
  method = "richness",
  mode = 2,
  reps = 3,
  threads = 1,
  verbose = TRUE
)
```

Arguments

otutab	otutab
step	default 2000
method	one of "richness","chao1","ace","gc","shannon","simpson","pd","pielou"
mode	1 for little table, 2 for big
reps	reps
threads	use how many threads to calculate (default:1)
verbose	verbose

Value

ggplot

Examples

```
data(otutab, package = "pcutils")
a <- rare_curve_species(otutab, mode = 1)
plot(a)
```

RCbray1 *Calculate RCbray-curtis*

Description

Calculate RCbray-curtis

Usage

```
RCbray1(
  otutab,
  reps = 9,
  threads = 1,
  classic_metric = TRUE,
  split_ties = TRUE
)
```

Arguments

otutab	otutab
reps	how many simulation performed?
threads	use how many threads to calculate (default:4)
classic_metric	standardizes the metric to range from -1 to 1
split_ties	adds half of the number of null observations that are equal to the observed number of shared species to the calculation- this is highly recommended

Details

Parallelized version of the Raup-Crick algorithm for "abundance" data (Stegen et al. 2013).

Value

a dist

Examples

```
if (requireNamespace("picante")) {
  data(otutab, package = "pcutils")
  df2tree(taxonomy) -> phylo
  b_NTI1(phylo, otutab) -> bnti_res
  RCbray1(otutab, reps = 9) -> rc_res

  data.frame(
    type = factor(c("Homo_S", "Heter_S", "Homo_D", "D_limit", "Undominated"),
      levels = c("Homo_S", "Heter_S", "Homo_D", "D_limit", "Undominated")
    ),
    number = c(
      sum(bnti_res < (-2)), sum(bnti_res > 2),
      sum((abs(bnti_res) < 2) & (abs(rc_res) < 0.95)),
      sum((abs(bnti_res) < 2) & (rc_res < (-0.95))),
      sum((abs(bnti_res) < 2) & (rc_res > 0.95))
    )
  ) -> com_pro
  pcutils::gghuan(com_pro, reorder = FALSE)
}
```

RDA_plot *Plot RDA res*

Description

Plot RDA res

Usage

```
RDA_plot(
  phy.rda,
  Group,
  metadata = NULL,
  Group2 = NULL,
  env_rate = 1,
  mode = 1,
  tri = FALSE,
  Topn = 10,
  rate = 1,
  margin = FALSE,
  box = TRUE,
  pal = NULL,
  sample_label = TRUE,
  stat_ellipse = TRUE,
  coord_fix = FALSE,
```

```
  bi_text_size = 3,
  env_text_param = NULL,
  ...
)
```

Arguments

phy.rda	rda/cca object
Group	group vector for color
metadata	metadata contain Group
Group2	mapping point shape
env_rate	default 1
mode	plot mode:1~3
tri	plot variables segments?
Topn	how many variables to show?
rate	segments length rate
margin	plot the margin boxplot?
box	margin plot box or density?
pal	colors for group
sample_label	plot the labels of samples?
stat_ellipse	plot the stat_ellipse?
coord_fix	fix the coordinates y/x ratio
bi_text_size	biplot text size
env_text_param	parameters pass to geom_text
...	add

Value

ggplot

See Also

myRDA

suijisenlin *RandomForest*

Description

RandomForest

Usage

```
suijisenlin(otutab, group_df, topN = 10)
```

Arguments

otutab	otutab
group_df	a dataframe with rowname same to dist and one group column
topN	default: 10

Value

diff

Examples

```
if (requireNamespace("randomForest")) {
  data(otutab, package = "pcutils")
  suijisenlin(otutab, metadata["Group"]) -> rf_res
}
```

summary.pc_otu *Summary pc_otu*

Description

Summary pc_otu

Usage

```
## S3 method for class 'pc_otu'
summary(object, ...)
```

Arguments

object	pc_otu
...	add

Value

No value

Examples

```
data("pc_tax1")
summary(pc_tax1)
```

`taxonkit_filter` *Filter TaxIDs based on Taxonomic Ranks*

Description

This function uses the "taxonkit filter" command to filter TaxIDs based on taxonomic ranks.

Usage

```
taxonkit_filter(
  file_path,
  black_list = NULL,
  discard_noranks = FALSE,
  discard_root = FALSE,
  equal_to = NULL,
  higher_than = NULL,
  lower_than = NULL,
  rank_file = NULL,
  root_taxid = NULL,
  save_predictable_norank = FALSE,
  taxid_field = NULL,
  text = FALSE,
  data_dir = NULL
)
```

Arguments

`file_path`	The path to the input file containing TaxIDs. Or file text (text=TRUE)
`black_list`	A character vector specifying the ranks to discard.
`discard_noranks`	Logical value indicating whether to discard all ranks without order (default is FALSE).
`discard_root`	Logical value indicating whether to discard the root taxid (default is FALSE).
`equal_to`	A character vector specifying the ranks for which TaxIDs should be equal to.
`higher_than`	The rank above which the TaxIDs should be (exclusive).
`lower_than`	The rank below which the TaxIDs should be (exclusive).

rank_file	The path to a user-defined ordered taxonomic ranks file.
root_taxid	The root taxid (default is 1).
save_predictable_norank	Logical value indicating whether to save some special ranks without order when using lower_than (default is FALSE).
taxid_field	The field index of the taxid in the input file (default is 1).
text	logical
data_dir	directory containing nodes.dmp and names.dmp (default "/Users/asa/.taxonkit")

Value

A character vector containing the output of the "taxonkit filter" command.

Examples

```
## Not run:
taxids2 <- system.file("extdata/taxids2.txt", package = "pctax")
taxonkit_filter(taxids2, lower_than = "genus")

## End(Not run)
```

---

taxonkit_lca *Compute Lowest Common Ancestor (LCA) of TaxIDs*

Description

This function uses the "taxonkit lca" command to compute the Lowest Common Ancestor (LCA) of TaxIDs.

Usage

```
taxonkit_lca(
  file_path,
  buffer_size = "1M",
  separator = " ",
  skip_deleted = FALSE,
  skip_unfound = FALSE,
  taxids_field = NULL,
  text = FALSE,
  data_dir = NULL
)
```

Arguments

file_path	The path to the input file containing TaxIDs. Or file text (text=TRUE)
buffer_size	The size of the line buffer (supported units: K, M, G).
separator	The separator for TaxIDs.
skip_deleted	Whether to skip deleted TaxIDs and compute with the remaining ones.
skip_unfound	Whether to skip unfound TaxIDs and compute with the remaining ones.
taxids_field	The field index of TaxIDs. Input data should be tab-separated (default 1).
text	logical
data_dir	directory containing nodes.dmp and names.dmp (default "/Users/asa/.taxonkit")

Value

A character vector containing the computed LCAs.

Examples

```
## Not run:
taxonkit_lca("239934, 239935, 349741", text = TRUE, separator = ", ")

## End(Not run)
```

---

taxonkit_lineage *Retrieve Taxonomic Lineage using taxonkit*

Description

Retrieve Taxonomic Lineage using taxonkit

Usage

```
taxonkit_lineage(
  file_path,
  delimiter = ";",
  no_lineage = FALSE,
  show_lineage_ranks = FALSE,
  show_lineage_taxids = FALSE,
  show_name = FALSE,
  show_rank = FALSE,
  show_status_code = FALSE,
  taxid_field = 1,
  text = FALSE,
  data_dir = NULL
)
```

Arguments

file_path	The path to the input file with taxonomic IDs. Or file text (text=TRUE)
delimiter	The field delimiter in the lineage (default ";").
no_lineage	Logical, indicating whether to exclude lineage information (default: FALSE).
show_lineage_ranks	Logical, indicating whether to append ranks of all levels in the lineage (default: FALSE).
show_lineage_taxids	Logical, indicating whether to append lineage consisting of taxids (default: FALSE).
show_name	Logical, indicating whether to append scientific name (default: FALSE).
show_rank	Logical, indicating whether to append rank of taxids (default: FALSE).
show_status_code	Logical, indicating whether to show status code before lineage (default: FALSE).
taxid_field	The field index of taxid. Input data should be tab-separated (default: 1).
text	logical,
data_dir	directory containing nodes.dmp and names.dmp (default "/Users/asa/.taxonkit")

Value

A character vector containing the taxonomic lineage information.

Examples

```
## Not run:
taxonkit_lineage("9606\n63221", show_name = TRUE, show_rank = TRUE, text = TRUE)

## End(Not run)
```

---

taxonkit_list *Taxonkit list*

Description

This function uses Taxonkit to perform the "list" operation, which retrieves information about taxa based on their TaxIDs.

Usage

```
taxonkit_list(
  ids,
  indent = "  ",
  json = FALSE,
  show_name = FALSE,
  show_rank = FALSE,
  data_dir = NULL
)
```

Arguments

ids	A character vector of TaxIDs to retrieve information for.
indent	The indentation string to use for pretty-printing the output. Default is " ".
json	Logical value indicating whether to output the result in JSON format. Default is FALSE.
show_name	Logical value indicating whether to show the scientific names of taxa. Default is FALSE.
show_rank	Logical value indicating whether to show the ranks of taxa. Default is FALSE.
data_dir	directory containing nodes.dmp and names.dmp (default "/Users/asa/.taxonkit")

Value

The output of the Taxonkit list operation.

Examples

```
## Not run:
taxonkit_list(ids = c(9605), indent = "-", show_name = TRUE, show_rank = TRUE)

## End(Not run)
```

---

taxonkit_name2taxid *Convert Taxonomic Names to TaxIDs*

Description

This function uses the "taxonkit taxonkit_name2taxid" command to convert taxonomic names to corresponding taxonomic IDs (TaxIDs).

Usage

```
taxonkit_name2taxid(
  file_path,
  name_field = NULL,
  sci_name = FALSE,
  show_rank = FALSE,
  text = FALSE,
  data_dir = NULL
)
```

Arguments

file_path	The path to the input file containing taxonomic names. Or file text (text=TRUE)
name_field	The field index of the taxonomic name in the input file (default is 1).
sci_name	Logical value indicating whether to search only for scientific names (default is FALSE).
show_rank	Logical value indicating whether to show the taxonomic rank in the output (default is FALSE).
text	Logical
data_dir	directory containing nodes.dmp and names.dmp (default "/Users/asa/.taxonkit")

Value

A character vector containing the output of the "taxonkit_name2taxid" command.

Examples

```
## Not run:
names <- system.file("extdata/name.txt", package = "pctax")
taxonkit_name2taxid(names, name_field = 1, sci_name = FALSE, show_rank = FALSE)
"Homo sapiens" %>% taxonkit_name2taxid(text = TRUE)

## End(Not run)
```

---

taxonkit_reformat *Reformat Taxonomic Lineage using taxonkit*

Description

Reformat Taxonomic Lineage using taxonkit

Usage

```
taxonkit_reformat(
  file_path,
  delimiter = NULL,
  add_prefix = FALSE,
  prefix_kingdom = "K__",
  prefix_phylum = "p__",
  prefix_class = "c__",
  prefix_order = "o__",
  prefix_family = "f__",
  prefix_genus = "g__",
  prefix_species = "s__",
  prefix_subspecies = "t__",
  prefix_strain = "T__",
  fill_miss_rank = FALSE,
```

```
  format_string = "",
  miss_rank_repl_prefix = "unclassified ",
  miss_rank_repl = "",
  miss_taxid_repl = "",
  output_ambiguous_result = FALSE,
  lineage_field = 2,
  taxid_field = NULL,
  pseudo_strain = FALSE,
  trim = FALSE,
  text = FALSE,
  data_dir = NULL
)
```

Arguments

file_path	The path to the input file with taxonomic lineages. Or file text (text=TRUE)
delimiter	The field delimiter in the input lineage (default ";").
add_prefix	Logical, indicating whether to add prefixes for all ranks (default: FALSE).
prefix_kingdom	The prefix for kingdom, used along with –add-prefix (default: "K__").
prefix_phylum	The prefix for phylum, used along with –add-prefix (default: "p__").
prefix_class	The prefix for class, used along with –add-prefix (default: "c__").
prefix_order	The prefix for order, used along with –add-prefix (default: "o__").
prefix_family	The prefix for family, used along with –add-prefix (default: "f__").
prefix_genus	The prefix for genus, used along with –add-prefix (default: "g__").
prefix_species	The prefix for species, used along with –add-prefix (default: "s__").
prefix_subspecies	The prefix for subspecies, used along with –add-prefix (default: "t__").
prefix_strain	The prefix for strain, used along with –add-prefix (default: "T__").
fill_miss_rank	Logical, indicating whether to fill missing rank with lineage information of the next higher rank (default: FALSE).
format_string	The output format string with placeholders for each rank.
miss_rank_repl_prefix	The prefix for estimated taxon level for missing rank (default: "unclassified ").
miss_rank_repl	The replacement string for missing rank.
miss_taxid_repl	The replacement string for missing taxid.
output_ambiguous_result	Logical, indicating whether to output one of the ambiguous result (default: FALSE).
lineage_field	The field index of lineage. Input data should be tab-separated (default: 2).
taxid_field	The field index of taxid. Input data should be tab-separated. It overrides -i/–lineage-field.
pseudo_strain	Logical, indicating whether to use the node with lowest rank as strain name (default: FALSE).

trim	Logical, indicating whether to not fill missing rank lower than current rank (default: FALSE).
text	logical
data_dir	directory containing nodes.dmp and names.dmp (default "/Users/asa/.taxonkit")

Value

A character vector containing the reformatted taxonomic lineages.

Examples

```
## Not run:
# Use taxid
taxids2 <- system.file("extdata/taxids2.txt", package = "pctax")
reformatted_lineages <- taxonkit_reformat(taxids2,
  add_prefix = TRUE, taxid_field = 1, fill_miss_rank = TRUE
)
reformatted_lineages
taxonomy <- strsplit2(reformatted_lineages, "\t")
taxonomy <- strsplit2(taxonomy$V2, ";")

# Use lineage result
taxonkit_lineage("9606\n63221", show_name = TRUE, show_rank = TRUE, text = TRUE) %>%
  taxonkit_reformat(text = TRUE)

## End(Not run)
```

---

time_by_cm *Time series analysis*

Description

Time series analysis

Usage

```
time_by_cm(otu_time, n_cluster = 6, min.std = 0)
```

Arguments

otu_time	otutab hebing by a time variable
n_cluster	number of clusters
min.std	min.std

Value

time_cm

Examples

```
if (interactive()) {
  data(otutab, package = "pcutils")
  otu_time <- pcutils::hebing(otutab, metadata$Group)
  time_by_cm(otu_time, n_cluster = 4) -> time_cm_res
  plot(time_cm_res)
}
```

`volcano_p` *Volcano plot for difference analysis*

Description

Volcano plot for difference analysis

Usage

```
volcano_p(
  res,
  logfc = 1,
  adjp = 0.05,
  text = TRUE,
  repel = TRUE,
  mode = 1,
  number = FALSE
)
```

Arguments

`res`	result of `diff_da` which have colnames: tax, log2FoldChange, padj, compare, sig
`logfc`	log_fold_change threshold
`adjp`	adjust_p_value threshold
`text`	text, TRUE
`repel`	repel, TRUE
`mode`	1:normal; 2:multi_contrast
`number`	show the tax number

Value

ggplot

See Also

`diff_da`

`z_diversity` *Calculate Zeta Diversity*

Description

This function calculates Zeta diversity for each group in the provided otutab.

This function plots the Zeta diversity results obtained from the z_diversity function.

Usage

```
z_diversity(otutab, group_df = NULL, zetadiv_params = list())

## S3 method for class 'zeta_res'
plot(x, lm_model = c("exp", "pl")[1], ribbon = FALSE, text = TRUE, ...)
```

Arguments

`otutab`	A matrix or data frame containing OTU (Operational Taxonomic Unit) counts.
`group_df`	A data frame containing group information.
`zetadiv_params`	Additional parameters to be passed to the Zeta.decline.mc function from the zetadiv package.
`x`	Zeta diversity results obtained from z_diversity function.
`lm_model`	The linear model to be used for fitting ('exp' or 'pl').
`ribbon`	Logical, whether to add a ribbon to the plot for standard deviation.
`text`	Logical, whether to add R-squared and p-value text annotations.
`...`	Additional arguments to be passed to ggplot2 functions.

Value

zeta_res

A ggplot object.

Examples

```
if (requireNamespace("zetadiv")) {
  data(otutab, package = "pcutils")
  zeta_result <- z_diversity(otutab, metadata["Group"], zetadiv_params = list(sam = 10))
  plot(zeta_result, lm_model = "exp", text = TRUE)
}
```

`z_diversity_decay` *Calculate Zeta Diversity with Distance*

Description

This function calculates Zeta diversity for each group in the provided otutab.

Usage

```
z_diversity_decay(otutab, xy_df, group_df = NULL, zetadiv_params = list())

## S3 method for class 'zeta_decay'
plot(x, ribbon = TRUE, ...)
```

Arguments

`otutab`	A matrix or data frame containing OTU (Operational Taxonomic Unit) counts.
`xy_df`	Site coordinates.
`group_df`	A data frame containing group information.
`zetadiv_params`	Additional parameters to be passed to the Zeta.ddecay function from the zetadiv package.
`x`	Zeta diversity results obtained from z_diversity_decay function.
`ribbon`	Logical, whether to add a ribbon to the plot for standard deviation.
`...`	Additional arguments to be passed to ggplot2 functions.

Value

zeta_decay

A ggplot object.

Examples

```
if (requireNamespace("zetadiv")) {
  data(otutab, package = "pcutils")
  zeta_decay_result <- z_diversity_decay(otutab, metadata[, c("lat", "long")],
    metadata["Group"],
    zetadiv_params = list(sam = 10)
  )
  plot(zeta_decay_result)
}
```

Index

a_diversity, 10, *33*
add_strip, 3
add_tax, 4
ALDEX, 5
all_ec_info, 5
ann_tree, 6
annotate, *34*
aor, 7
as.b_dist, 8
as.dist.b_dist, 9

b_analyse, 12, *35*
b_NTI1, 13
b_res_3d, 14
bbtt, 11
before_tree, 11

check_taxonkit, 14
compare_means, *22*
cor_net, 15

df2tree, 15
df2tree1, 16
diff_da, 16, *56*
download_taxonkit_dataset, 17

easy_tree *(*ann_tree*)*, 6
envfit, *18*
envfitt, 18

geo_sim, 18
geom_strip, *3*
geom_text, *46*
get_diff_type, 19
ggtree, *7*
gp_dis_density, 20
grap_p_test, 20
group_box, *33, 34*

install_taxonkit, 21

kwtest, 21

load_N_data, 22

mat_dist, 23
micro_sbatch, 23
multi_bar, 24
my_lm, *33*
myCAP *(*myRDA*)*, 25
myCCA *(*myRDA*)*, 25
myRDA, 25, *46*

name_or_id2df, 26
ncm, 27
nst, 28
nti_rc, 29

pc_otu, 30
pc_tax1, 31
pc_valid, 31
permanova, 32, *35*
plot.a_res, 33
plot.AOR *(*aor*)*, 7
plot.b_dist *(*as.b_dist*)*, 8
plot.b_res, 33
plot.dist *(*as.b_dist*)*, 8
plot.g_test, 35
plot.ncm_res *(*ncm*)*, 27
plot.NTI_RC *(*nti_rc*)*, 29
plot.pro_res, 36
plot.rare_res *(*rare_curve_sample*)*, 42
plot.time_cm, 36
plot.zeta_decay *(*z_diversity_decay*)*, 58
plot.zeta_res *(*z_diversity*)*, 57
plot_element_cycle, 37
plot_N_cycle, 38
pre_fastp, 39
pre_tax_table, 40
print.pc_otu, 41
procrustes_analyse, 41

rare_curve_sample, 42
rare_curve_species, 43
rarefaction, 42
RCbray1, 44
RDA_plot, 45

stackplot, *30*
suijisenlin, 47
summary.pc_otu, 47

taxonkit_filter, 48
taxonkit_lca, 49
taxonkit_lineage, 50
taxonkit_list, 51
taxonkit_name2taxid, 52
taxonkit_reformat, 53
time_by_cm, 55

unifrac, *19*, *23*, *26*

vegdist, *19*, *23*, *26*
volcano_p, 56

z_diversity, 57
z_diversity_decay, 58